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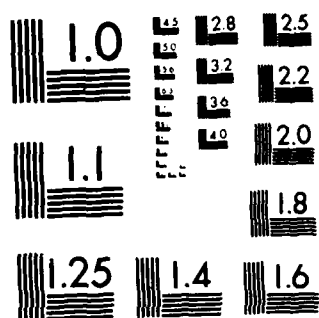
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**DESCRIPTION OF TECHNIQUES IN ACCOUNTING  
AND FINANCIAL MANAGEMENT APPROPRIATE FOR  
PROTOTYPE DEVELOPMENT IN THE PLANNING PROCESS**

**February 22, 1983**

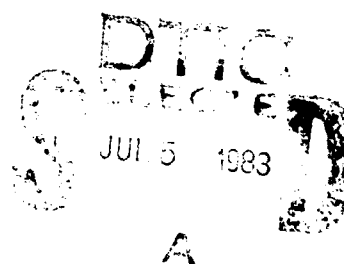
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Prepared for:

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## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
PREFACE.....	i
I      APPLICATIONS OF MICROCOMPUTER TECHNOLOGY IN THE PLANNING PROCESS.....	I-1
II     "PLANNING ISSUES MEMORANDUM": DISCUSSION OF CENTRALIZATION VERSUS DECENTRALIZATION OF FINANCIAL MANAGEMENT SYSTEMS.....	II-1
III    MODELING TECHNIQUES.....	III-1
IV    PLANNING CONFERENCE.....	IV-1
V     POST IMPLEMENTATION REVIEW OF A SYSTEM'S MISSION ATTAINMENT.....	V-1
VI    POTENTIAL USE OF INDUSTRIAL ENGINEERING TECHNIQUES.....	VI-1
VII   SHORT TOUR CONCEPT.....	VII-1



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## PREFACE

The pages that follow provide descriptions of techniques in accounting and financial management appropriate for prototype development in the planning process. The purpose of these descriptions is to assist the Planning Division, Navy Accounting and Finance Center, in selecting techniques for preparation of planning wedge packets for prototype development.

The candidate techniques described herein were selected because of their applicability to the Planning Division's mandate for development, evaluation, and monitoring of policies, concepts, plans, and objectives for Department of the Navy (DON) accounting and financial management systems improvement. Each of the techniques described will provide NAFC-12 personnel with the opportunity to take a more interactive, real-time approach to working with the project managers in the other directorates and commands.

The immersion of the planning staff in the day-to-day activities of the on-going projects will not only assist those projects, but also over time, build up the technical skills and field experience of the planning staff. The end result of this effort will be higher quality middle and long range plans for improvements in financial management.

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## I. APPLICATIONS OF MICROCOMPUTER TECHNOLOGY IN THE PLANNING PROCESS

### INTRODUCTION

*This report focuses*

This discussion will focus on the applications and associated advantages of microcomputer technology in the Planning Division and other commands involved in financial systems planning. The objective of using a microcomputer in the planning process is to provide more timely and accurate information, provide upper management with additional decision-making information and reduce manual effort. As a result, the Planning Division will have better control of the planning process with additional time and capabilities to branch into new areas of planning.

### BENEFITS

The applications which may be useful to the Planning Division and the other divisions include:

- graphics;
- word processing/text editing;
- "tickler" file;
- electronic spread sheet accounting (including a projection capability); and
- modeling.

### Graphics

A graphics package can create a number of useful charts and graphs including: Gantt charts, PERT charts, bar graphs, curves, or pie charts in black and white or color. These and similar graphic presentations provide a simplified and highly visual display of otherwise complex information. An automated graphics system facilitates rapid production of these displays and provides the capability to easily and quickly generate alternative presentations. When updates are needed, the system will automatically create a revised graph or chart based on the updated information.

### Word Processing/Text Editing

With a word processor/text editing software package, the Planning Division can update, edit, rearrange and store all plan narratives, reports, and other documents. This will facilitate the concept of a "living" plan, one that can be readily updated to reflect frequent changes.

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### "Tickler" File

On an on-going basis the microcomputer can be used as a scheduling and "tickler" system. For example, the schedule for Plan updates can be input into the system and reviewed by the planning staff as desired. Also, the milestone schedules for current projects can be input so that the Planning Division will be reminded to check with the project manager on his project's progress. This will provide NAFC-12 with a valuable aid to supplement the information received from and reducing reliance upon the Project Managers. Thus enabling NAFC-12 to track project progress without relying solely on the project managers. Through the use of this tool, the Planning Division can be assured of a timely and effective updating process. The system can also contain documents and/or questionnaires used in the updating function which can be printed on hardcopy, as needed.

### Electronic Spread Sheet Accounting

A spread sheet package can be used to eliminate numerous manual calculations. This is particularly useful in large spread sheets where several calculations must be completed and a change in one assumption will require total recalculation. On a microcomputer, when data is revised the calculations and totals are updated automatically to reflect the revision, eliminating any manual effort.

If resource estimates are incorporated into the Master Plan, the Planning Division can create a spread sheet with project dollar costs or man-hours per year. With such a spread sheet, the system can calculate yearly totals and variances between planned and actuals. Attached is a sample spread sheet on the DON's FMIP. The resource costs are hypothetical to illustrate the calculation capabilities of a software spread sheet package. Also, if an assumption is made that the resources are going to increase at a given percentage each year, the spread sheet can calculate the annual resources for the individual projects based on the first year's data. Other spread sheet applications include budgeting and an EDP risk matrix.

### Modeling

The Planning Division can use a microcomputer for modeling techniques. Modeling techniques test the impact of "what if" assumptions and scenarios and can be used for cost/benefit, risk or sensitivity analyses. These techniques are discussed in further detail in Section III.

### CONCLUSION

This discussion has briefly described a few of the potential applications of a microcomputer system as a planning tool in NAFC-12. A microcomputer will provide more timely and accurate information for decision making while reducing the amount of manual effort required. Microcomputer techniques found to be effective time-savers at NAFC-12 can also be exported to other directorates and commands to facilitate their planning efforts.

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# Electronic Spread Sheet Sample

IN PARTMENT OF THE NAVY (G-11)

IN LINE RESOURCES (\$000 (MILLION))

	LY01	EXR2	EXR3	LYR4	EXR5	EXR6	LYR7	LYR8	LYR9	LYR0	TOTAL
<u>APPROPRIATIONS SYSTEMS</u>											
INTEGRATED DISBURSING/ACT	100	110	115	120	120	125	130	130	135	140	1225
BUDGET AUTOMATION	500	500	510	510	520	530	540	550	550	550	5265
PLANNING, PROGRAMING, BUDGET/ACT	200	230	240	250	250	250	255	260	275	280	2490
ADVANCE APPROPRIATIONS DEVELOPMT	100	120	120	125	125	130	140	150	155	160	1325
SUBTOTAL	900	960	985	1005	1020	1035	1065	1020	1115	1130	10105
<u>PAY, TRAVEL, DISBURSING SYSTEMS</u>											
NAVY STD CIVILIAN PAYROLL	500	525	530	535	540	550	560	575	580	590	5485
MILITARY PAY SYSTEMS IMPROVEMENT	6000	6100	6200	6200	6250	6300	6300	6700	6775	6800	64025
PAY/PERSONNEL ADMINISTRATIVE	700	700	725	730	735	750	750	800	810	820	7520
DISBURSING IMPROVEMENTS	550	560	575	575	580	580	590	600	640	650	5900
AUTOMATED CLAIMS PROCESSING	300	310	325	300	320	325	335	350	375	375	4715
ADVANCE PAY SYSTEMS DEVELOPMENT	600	625	630	630	650	650	675	675	670	680	6485
SUBTOTAL	8650	8820	8985	9120	9225	9355	9610	9700	10050	10115	94130
<u>INDUSTRIAL FUNDS</u>											
NAVY/INDUSTRIAL FINANCIAL MGMT	765	780	790	800	820	860	870	885	890	890	8150
STD AUTOMATED FINANCIAL SYSTEM	900	950	975	975	990	1000	1000	1155	1200	1200	10345
PUBLIC WORKS CENTERS MGMT INFO	250	260	270	270	285	300	350	400	410	420	3215
PRINTING RESOURCES MGMT INFO	300	320	320	320	340	340	350	375	400	425	3490
NAVY INDUSTRIAL FUND IMPROVEMENT	460	470	470	475	500	500	510	520	525	525	4975
SUBTOTAL	2675	2780	2825	2840	2935	3000	3010	3115	3125	3160	10515
<u>OTHER FUNDS</u>											
INVENTORY ACCOUNTING IMPROVEMENT	800	810	820	845	850	860	880	900	910	980	8645
INVENTORY SYSTEM	200	200	200	200	230	235	240	250	260	275	2145
SUBTOTAL	1000	1010	1020	1045	1080	1095	1120	1150	1170	1255	10790
<u>IN LINE SUPPORT SYSTEMS</u>											
INTEGRATED DATA LINKS	500	510	510	510	510	530	540	550	580	590	5480
DATA PROCESSING AND SUPPORT	400	410	420	420	420	430	430	430	430	430	4400
INTEGRATED DATA LINKS	200	200	200	200	200	200	200	200	200	200	2000
SUBTOTAL	1100	1120	1130	1130	1160	1160	1170	1180	1210	1220	11880

## II. "PLANNING ISSUES MEMORANDUM": DISCUSSION OF CENTRALIZATION VERSUS DECENTRALIZATION OF FINANCIAL MANAGEMENT SYSTEMS

### INTRODUCTION

This discussion will focus on the benefits to NAFC-12 of the issuance of periodic "Planning Issues Memoranda", and on the particular utility of such a memorandum on the issue of centralization versus decentralization in financial management systems. The Department of the Navy has been criticized for having developed numerous management information systems at major commands that are duplicative in scope. See the October 15, 1979 Report by the U.S. General Accounting Office entitled "Duplication of the Navy's Management Information Systems Is Costly." The present FMIP Master Plan attempts to solve this problem via numerous system consolidation and standardization initiatives, including consolidation of design responsibility.

The Navy's inventory of duplicative decentralized MIS has evolved over the years due, in part, to the nature of its decentralized command structure. An advantage of this currently decentralized MIS development is that each command can obtain an MIS tailored to its own needs. The disadvantages of a decentralized system include the enormous costs of highly duplicated software and a lack of standardized Navy accounting systems. The argument for a decentralized MIS environment has been strengthened by the dramatic decreases in ADP hardware cost brought about by mini/microcomputers.

The technique proposed in this section, for consideration of development as a planning wedge packet, is the issuance of formal Planning Issues Memoranda. In this particular case, the Planning Issues Memorandum would provide an objective discussion of the advantages and disadvantages associated with either a centralized or a decentralized strategy. The purpose of this memorandum would be to focus discussion within the Navy on the validity of its system design consolidation effort. As a result, policies could be developed or modified to guide the long range plan of system improvements.

If successful, the Planning Issues Memorandum technique could be used to focus discussion on other broad planning issues and thus serve to stimulate long range thinking.

### BENEFITS

The benefits accruing from the issuance of a Planning Issues Memorandum on the centralization versus decentralization issues are as follows:

- o an updated perspective, based upon the latest technology as it bears upon approaches to ADP systems operations and development, and accounting functional operations; and

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- o an opportunity to upgrade the skills of the planning staff through involvement in the latest technological issues such as distributed processing, programmerless development and prototyping.

There are three major aspects of the centralization/decentralization issue. These are:

- o ADP hardware configuration;
- o software development; and
- o functional operations.

Each aspect is summarized briefly below. If this issues paper technique is adopted, the wedge packet would incorporate a broader discussion of these and related matters.

#### ADP Hardware Configuration

A decade ago, a centralized ADP network with a large host mainframe serving several remote terminals was the normal configuration approach for servicing several remote sites. The reasons for this configuration were mainly economical -- a mainframe computer was such a large capital investment that it was inconceivable for each site to have a dedicated host central processing unit. Moreover, the centralized "hub" approach required only one systems operation staff.

The dramatic improvements in the ADP performance/cost ratio have eroded the economic advantages of the hub approach. Today, a mini/microcomputer configuration with one megabyte of main memory and ten megabytes of "hard" Winchester-type disk memory can be purchased for less than \$20,000. Thus, the mini-at-each-site approach may produce significant savings in telecommunications expenses when compared to the time-sharing hub approach.

A third alternative is to combine the hub and the mini-at-each-site approach to form a distributed network. This provides reduced telecommunications expenses because a substantial portion of the processing requirements are off loaded to local sites but communication with headquarters or the regional hosts is provided for those applications that require it.

#### Software Development

Although an application may be processed on a decentralized, distributed ADP hardware configuration (which could be either stand-alone minis or communications linked minis), the software could still be standardized and developed centrally. Remote sites can receive their production software in object code format. The major advantages of centralized design is that the design costs can be spread over several user sites and all sites will use standard procedures, facilitating staff training and transferability.

Another approach is to have each site develop its own software and procedures. The main advantage of this approach is organizational: a manager can

have a system tailored to his unique requirements and is not dependent upon a central design agent. The major disadvantages of this approach are the duplicative development costs and the great likelihood of nonstandard practices and lack of support. This usually makes coordination, training, and transfer of personnel among different units more difficult. Conclusions resulting from compliance audits performed at one site are not relevant to other sites.

The adverse effects of decentralized development can be mitigated by dictating standard interface requirements. An example of this approach is the Internal Revenue Service requirement that payroll withholding data be transmitted on magnetic tapes prepared in a prescribed format. The IRS is not concerned with how the employer produces the tape as long as the data is accurate and in the prescribed format. Since the IRS does not have audit-level assurance that each employer's system has good internal control and produces accurate data, standard interface requirements are all that is realistically feasible.

#### Functional Operations

Functional accounting operations can be performed at different levels on the centralization/decentralization spectrum. A centralized accounting activity is generally performed on a centralized ADP hardware configuration. However, a decentralized accounting function can be performed on either a centralized hardware configuration (using remote terminals) or a decentralized configuration (using stand-alone minicomputers).

Even configurations based on stand-alone minicomputers can provide decentralized functional processing with centralized summarization. This could be achieved by mailing diskettes to a host ADP center or through telecommunications.

#### CONCLUSION

The dichotomy of poles (centralized and decentralized) and the trichotomy of aspects (ADP hardware, development, and functional operations) can be arranged in a two-by-three matrix. A study can proceed with an investigation of past projects that were developed and operated according to the characteristics of each cell in the matrix. The assets and liabilities of each system investigated can be enumerated and quantified (if possible). This empirical data can be used to establish policies and guide long-range planning. The general Planning Issues Memorandum techniques can be expanded, if successful here, to other issues as a stimulus to thinking about planning.

### III. MODELING TECHNIQUES

#### INTRODUCTION

This discussion will focus on the benefits to NAFC-12 of utilizing modeling techniques during the planning process. Modeling is an effective method of evaluating alternative system options and examining the impact of alternative scenarios. A model can also be used to develop analyses such as sensitivity, cost/benefit and risk. The advantage of using modeling to evaluate alternative system plans is that it documents the impact of the assumptions, thus providing management more information for decision making purposes. This, in turn, leads to more confidence in and commitment to the planning process.

Modeling techniques can range in difficulty from very complex, where numerous detailed assumptions and variables are examined, to very simplistic where only the key impact variables are considered. For planning purposes only a simple model which will test the effect of major events and assumptions is necessary. The model can be designed to determine the impact of significant events on the project milestones, other project timetables, costs, man-hours, and field operations.

#### BENEFITS

As the Planning Division becomes increasingly involved in assisting other divisions in the development of Plan input, it is imperative that the Planning Division have an approach to evaluating system options. This discussion will outline the advantages of using modeling in the planning function and will highlight the following areas:

- the evaluation of alternative systems;
- the development of sensitivity, cost/benefit, and/or risk analyses;
- the development of contingency plans; and
- the discussion of modeling examples.

#### Evaluation of Alternative Systems

Through the use of modeling, the Planning Division will be able to evaluate each alternative system design under numerous environmental, operational or budgetary assumptions. This enables NAFC-12 to develop strategies which are responsive to the "most likely" scenario. The advantages of examining multiple scenarios include:

- political, economic and technological issues can be simulated as they occur in real life;
- alternative scenarios will emphasize the adaptability of strategies to future conditions; and
- management can participate more readily in the development of a "most likely" scenario than in more analytical techniques.

Although this technique does not require a computer planning model, an automated model requires only a change in input data to evaluate any change in assumptions, and eliminates the manual reworking of schedules or calculations.

#### Development of Analyses

Modeling lends itself toward the development of analyses. Through the use of modeling, the Planning Division can develop cost/benefit, risk and sensitivity analyses for the assessment of system options. While examining particular options under different assumptions, the Planning Division can determine which systems are particularly sensitive to changes in the environment. This type of analyses will give the Planning Division the opportunity to develop future system enhancements which will reduce the financial and accounting systems' vulnerability to a change in environment. Senior management should be made aware of especially vulnerable areas within the Plan during the approval process.

Through the use of modeling and analyses, the completed Plan can contain a list of assumptions, along with a discussion on the kinds of situations which could significantly lower the value of the plan, including precautions which could reduce the risks. The precautions are determined based on tests of the options' sensitivity under various assumptions.

The Planning Division can use the model to manipulate the timing of project milestones and resource estimates to determine the most efficient method of future system implementation.

#### Development of Contingency Plans

Given the uncertainty inherent in long range planning, it is beneficial to develop contingency plans to take into account likely future events. These contingency plans can be developed by modeling the impact of multiple scenarios on the long range plan. Then, when there is a major shift in the Navy environment, the relevant contingency plan can be put into effect. This approach increases the flexibility of the long range plan.

#### Discussion of Modeling Examples

Two examples of modeling applications relevant to NAFC will be discussed: 1) a cost effectiveness analysis; and 2) an information flow analysis.

Cost Effectiveness Analysis. The modeling example on cost effectiveness will focus on the analysis of an effort to consolidate processing centers. To evaluate alternative consolidation strategies based on a cost criteria, the analysis should consider the initial investment, the operating costs, the salvage value of real assets and the timing of these costs. An automated model will eliminate the manual recalculations required in an interactive process where numerous assumptions are tested.

In this example, a complete analysis may include the manipulation of assumptions such as: the number of processing centers; the number of personnel; the telecommunication costs; and the computer costs. The results of the analysis will be a determination of the optimal number of processing centers.

Further analyses can result in a determination of the most cost effective computer system for the processing centers, a centralized system or a decentralized system. Once a cost effectiveness model is developed, it can be utilized, with some manipulations, to analyze other cost effectiveness problems both within NAFC-12 and in the field operations.

Informative Flow Analysis. An example of an information flow analysis relevant to NAFC is the development of a model to simulate the payment authorization process prior to disbursement. By looking at historic records and questioning the individuals involved in each step of the process, it is possible to simulate the amount of time and labor required to complete a payment disbursement. The model can go so far as to take into account sick leave, vacation leave and vacant positions of the employees involved in the disbursement area.

Using simulations, different policies can be tested under the same conditions (number of outstanding vouchers, types of payments, locations of disbursing centers) to determine, for example, which of two alternative policies produce shorter response times or lighter workloads.

#### CONCLUSION

The Planning Division can use modeling techniques to: aid in the evaluation of alternative strategies; examine the impact of alternative scenarios; develop analyses; and design contingency plans. The models can be as simple or complex as necessary. By utilizing this state-of-the-art technique, NAFC-12 can increase the flexibility of the long range plans and provide senior management with additional decision-making information.

#### IV. PLANNING CONFERENCE

##### INTRODUCTION

This discussion will focus on the use of conference of T-group techniques by NAFC-12. As a result of using these techniques, the Planning Division will gain additional credibility as an active participant in DON-wide planning. NAFC's sponsorship role in such a conference is to assure a structured environment in which ideas can be exchanged and problem areas explored.

The participants should include a member of NCB, a representative from CNO, a representative from the comptroller's office, and all NAFC directors. With these participants, the planning conference can explore the goals, objectives and assumptions which must be considered in the Master Plan. The sought for end result will be a better understanding and coordination, and perhaps, a consensus on the general direction of future system improvements and design.

The session should be held away from the office and be of adequate duration so that the directors can concentrate on the issues at hand.

##### BENEFITS

The benefits of a planning conference are discussed in the paragraphs that follow.

##### Structured Environment

Through agenda planning and development, NAFC-12 can lead the conference attendees through the logical phases of systems planning. Pre-conference mailing of agenda and discussion areas will enhance conference benefits by giving lead time for preparation of generalized planning outlines. The conference environment will thus provide a focus for more indepth planning by leading the group through planning stages i.e. preplanning activities, plan implementation, and plan evaluation.

The agenda would be constructed to achieve shared understanding of the general direction of the financial systems to fulfill DON goals and objectives. It could consist of the following:

- A presentation by the Navy's Comptroller or Deputy Comptroller on near and long term objectives;
- A general discussion on the goals of the future system enhancements;
- A presentation of point papers on technological, statutory, and regulatory changes, and a discussion on how the Plan should accommodate each; and



- A presentation of the long range planning assumptions with a discussion on what variables should be included in the "most likely" scenario.

#### Feedback

The conference serves as an arena for feedback in a non-threatening context. Throughout the meeting, attendees will be exchanging their long range planning concepts and ideas. Through this exchange, each director can look at his division from another point of view. Consequently, previously unexplored concepts and techniques will surface which may result in a reassessment of Plan issues.

In addition to providing new ideas, the feedback process also prevents system replication through open communication between divisions. Due to the relative autonomy of each division, it may not be apparent that two staff offices are planning a similar system effort. In an environment designed to promote planning, barriers between divisions will be reduced, and organizations and individuals will be more likely to adopt a cooperative rather than a competitive stance.

#### Expert Consultation

The planning conference presents an ideal situation for implementation of a modified Delphi technique. This technique consists of soliciting topical information from individuals considered experts in their field. Using this approach, NAFC-12 can canvas a group of experts in the fields of financial systems and/or current legislative activities. These experts can keep NAFC-12 abreast of recent developments. If possible, the experts can also make presentations at the planning conference or act as facilitators or conference resource people.

#### CONCLUSION

The products resulting from a planning conference can be a general consensus on: the future direction of DON financial systems; the assumptions to be utilized in the Plan; and the relevant DON goals and objectives. The initial conference should adopt the goal of setting long term objectives and of providing the setting for developing a road map; i.e., a long range plan, for their accomplishments.

Subsequent planning conferences held prior to the scheduled annual update of the Master Plan gives all the NAFC directors the opportunity to reassess the Plan under current conditions. The prospective system enhancements can be evaluated based on: the past year's events; current projects' progress; technological changes; revised long range planning assumptions; and revised DON-wide goals and objectives.

## V. POST-IMPLEMENTATION REVIEW OF A SYSTEM'S MISSION ATTAINMENT

### INTRODUCTION

This discussion will focus on the use of a post-implementation review by the Planning Division. A post-implementation review of a system's mission attainment is designed to:

- determine whether original user requirements have been met;
- assess system performance in terms of user satisfaction, operations and cost; and
- develop recommendations for system improvement.

Specifically, this review evaluates the capability of a system to provide users with cost effective, timely and accurate information for use in the decision-making process.

### BENEFITS

The post-implementation review is a powerful tool which can be adopted by the Planning Division for use in its newly acquired systems evaluation function. The use of this technique will aid a structured evaluation of financial management systems in terms of DON mission and objectives and will provide NAFC-12 with a clear basis for establishing systems recommendations. These recommendations can then be integrated into the planning division's mid and long range financial management plans and improvement efforts. A reciprocal effect is achieved whereby post implementation reviews provide a basis for more refined planning and policy development, thus providing a basis for more efficient systems design and development.

The major steps in a typical post-implementation review are described briefly below.

#### Review Implementation

The review implementation consists of two stages: fact finding and analysis. These steps will be carried out in each of the following functional areas: personnel efficiency, data and report utility, and benefit achievement.

During review implementation, NAFC-12 should involve the organizational divisions, which developed the system, and the functional sponsors to obtain a clear understanding of the system's intentions and subsequent performance on a first hand basis.

Personnel Efficiency. All personnel involved in the processing cycle from data entry clerks to report preparers must be identified and evaluated for efficiency of interaction with the system. The source of any deficiency should be determined and recommendations prepared. For example, problems in system interaction can arise because of mission modification. Operating personnel will experience difficulties in carrying out a revised mission when the system was originally designed to fulfill another function. As a result, a system initially supportive of agency objectives may no longer be effective under new conditions. Recommendations could include system redesign or reeducation of the operating personnel.

Data and Report Utility. The identification and evaluation of systems output should be based on three criteria: (1) Does appropriate, valid and unbiased data exist? (2) Is this information being communicated in an appropriate format to user management? (3) Does management use the information in decision making? The evaluation of data utility necessitates that the audit team possess or acquire a working knowledge of the organizational needs and information flows. Greater sensitivity can be achieved through user interviews as part of the fact finding process.

It would be useful during this phase if the Planning Division contacted the functional sponsors to ascertain if informational needs are being met or if valuable time is being wasted sifting through irrelevant data. Taking into account the Navy's emphasis on integrated financial management systems, a comparison should be made of different user groups' success in systems utilization. For example, Headquarters personnel in Washington may indicate that an integrated disbursing system is producing timely and relevant payment data, while field offices may not receive any reports or not receive them in a timely manner.

Benefit Achievement. Any discussion of expected versus actual benefits must include both intangible and tangible benefits. It will be necessary to interview the systems users, particularly when assessing those intangible benefits, such as improved decision making. In addition to interviews, actual cost savings can be defined by an analysis of historical data. Pre-and follow-up cost/benefit analyses also can provide a basis for evaluation if they are reinforced by interviews and personnel observation.

## CONCLUSION

In addition to comparing projected versus actual performance, the review serves to trace deficiencies back to their source. Once a clear understanding of the causes of a deficiency is known, then the committee can proceed to prepare recommendations. Recommendations should address both the operational and mechanical aspects of the system and can include changes to users methods of utilization, reeducation of operating personnel, and system enhancement. In cases where changes in mission objectives have affected system utility, certain phases of the system may require redesign. The prospective redesign can then be integrated into the Master Plan.

## VI. POTENTIAL USE OF INDUSTRIAL ENGINEERING TECHNIQUES

### INTRODUCTION

One of the difficulties of long range planning is that external constraints such as new regulatory requirements may require organizations to shift resources in a manner different than originally planned. Industrial engineering techniques can be utilized by the Planning Division to evaluate operational processes resulting in the development of system improvements to be integrated in the mid and long range plans.

A recent example of a regulatory requirement which may require operational changes is the Prompt Payment Act of 1982. To facilitate compliance with the Prompt Payment Act, industrial engineering techniques can be used to determine if near term procedural changes can be made to streamline the vendor payment cycle. A major advantage of this approach is that it is generally easier to make near term system changes by revising manual procedures than by reprogramming the applications software.

### BENEFITS

Application of industrial engineering techniques to evaluating the vendor payment cycle may yield the following benefits:

- a more streamlined payment cycle due to greater concurrent task performance and a more systematic approach to workload smoothing and distribution;
- a greater awareness and knowledge of industrial engineering throughout DON accounting activities. This greater awareness and knowledge may enable personnel to apply these same techniques to yield improvements in other functions; and
- an opportunity to involve Planning Division personnel on a real-time basis in solving today's problems. This assistance would benefit both the accounting activity and the Planning division because the planning personnel would obtain additional valuable field experience.

### Approach to Using Industrial Engineering Techniques

The following industrial engineering techniques may be useful for studying and improving a set of manually-performed functions:

- Work measurement - This involves quantifying the labor content, in staff hours, necessary to perform a specific task. This is usually

done by recording the time needed to perform several iterations of the task and then calculating a per-unit rate. There are a number of approaches to measuring work. An expedient and economical approximating method is work sampling. Work sampling involves observing work on random occasions and extrapolating the results to the entire work week. A more elaborate approach is detailed diary reporting in which all activities are assigned numerical codes, and workers record the task code and stop times on coding sheets that are computer summarized. There are other work measurement approaches including corroborated interviews and time and motion studies.

- Queuing model - The vendor payment cycle resembles the classic queuing model where there are different work stations with respective service times. Arrival time and service time distributions can be estimated and an interactive program can be used to perform sensitivity analysis and simulate results of different staffing levels. The total transaction elapsed time, station service times, and wait times can be evaluated under different staffing assignments.

The above techniques can be used to evaluate payment activities to identify bottle necks and excessive queue waiting times. Alternative staffing configurations can be proposed and evaluated. Those staffing configurations that show promise can be pilot tested to see if transaction elapsed time is reduced.

#### CONCLUSION

The use of the industrial engineering techniques described above to evaluate the vendor payment process can be tailored to analyze other accounting processes. The Planning Division can incorporate this type of technique in evaluating alternative processes to be integrated in the Master Plan.

## VII. SHORT TOUR CONCEPT

### INTRODUCTION

An important criterion for effective planning is that participants be knowledgeable about the subject matter and organization for which they are planning. An alternative to recruiting experienced field personnel to staff the Planning Division is to send existing Planning Division personnel (who do not possess the desired field accounting experience) on short tours (10 to 30 days) to field accounting or design activities. If coordinated properly, this tour can benefit both the receiving activity, by providing an additional resource during a period of urgent demand, and the Planning Division, by giving the planning analyst some operational experience.

### BENEFITS

Over time a well structured and planned short tour program will yield the following benefits:

- valuable, real-time consulting expertise provided to project managers; and
- a well-rounded planning staff with "hands on" problem solving experience in accounting operations and systems development.

### Approach to Implementing a Short Tour Program

Selection of the Receiving Unit. Receiving units will be encouraged to apply for the use of a planning analyst. The assigned planning analyst can effectively participate in such activities as: system life cycle documentation; quality assurance; and system crossover planning. If the demand for planning analysts exceeds the supply available, preference can go to nearby organizations to keep travel expenses to a minimum.

Need for Pre-Tour Planning and Coordination. If the short tour program is to be a success, it must get off to a good start and provide benefits to both the receiving unit and the Planning Division. If the first several attempts at having a tour result in marginal value, there will be little enthusiasm for continuing the program. Therefore, procedures should be instituted for pre-tour planning and coordination. These procedures can include:

- tour work content to be defined in advance in sufficient detail to avoid erroneous expectations;

- pre-tour interview (in person for local units) in which the receiving project manager and the planning analyst can discuss the scope of effort and determine if the tour would be mutually beneficial; and
- advance reading assignments so that the planning analyst can be knowledgeable about the specific subject matter and thus, productive on the first day of the tour.

Post-Tour Appraisal. At the conclusion of the tour, the receiving project manager and the planning analyst will complete a post-tour evaluation report in which they list the strong and weak aspects of the tour and suggest recommendations for improvement. These post-tour evaluation reports can be a valuable source of ideas for improving the tour program.

#### CONCLUSION

The short tour approach has the potential to be of significant benefit to an over-loaded project as well as to the Planning Division. In order for this program to be a success, it must produce tangible results from the start. This can be best achieved by instituting sufficient procedures for pre-tour planning, coordination, and post-tour appraisal.

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